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indicators of phylogeny." "In fact, until more knowledge is obtained with regard to the interrelationship of plant members and the influence of environment—in a word, the influence of physiological necessity on morphological expression—we cannot determine with any degree of certainty the precise value of many anatomical characters." The same disposition is made of the size and number of vascular bundles in connection with the transition phenomena. "Sufficient has been said to show the enormous importance of physiology in questions relating to vascular tissues; for our own part we are strongly of the opinion that no real further advance in our knowledge of morphology, more especially of the higher plants, is possible without an adequate investigation of the physiology of the members concerned."—J. M. C.

Inheritance of quantitative characters.—EMERSON and EAST⁴⁸ have discussed this subject rather fully and have presented data bearing upon it secured from experiments with maize. Inheritance was studied in number of rows per ear, length of ear, diameter of ear, weight of seeds, breadth of seeds, and height of plants. The general conclusion is stated compactly as follows: "The results secured in the experiments with maize were what might well be expected if quantitative differences were due to numerous factors inherited in a strictly Mendelian manner. It is quite likely that genetic correlations occur between factors for distinct quantitative characters. These and the physiological correlations so frequently noted make the results more difficult of interpretation, but do not throw them out of the realm of Mendelian phenomena. Physiological correlation is a phenomenon of development, not of inheritance, and as such has less interest for students of genetics than for experimental morphologists. Even in practical plant breeding, correlations of this sort are of importance mainly on account of the physiological or morphological limits that they set to the perfect development of particular combinations of characters."—J. M. C.

The individuality of the plastid.—In a preliminary paper⁴⁹ published two years ago, Sapëhin found plastids even in sporogenous tissue, both in monoplasic types, like *Anthoceros*, *Isoetes*, and *Selaginella*, and in polyplastic forms, like the majority of plants. In a second preliminary account⁵⁰ he deals principally with *Lycopodium*, which he finds to belong to the monoplasic type; and with *Funaria*, which belongs to the polyplastic type. In the antheridium of *Funaria*, which starts as a polyplastic organ, cell division is not accompanied by any division of the plastid, and consequently the spermatogenous cells soon become

⁴⁸ EMERSON, R. A., and EAST, E. M., The inheritance of quantitative characters in maize. Agric. Exper. Station, Univ. Neb., Research Bull. 2. pp. 120. figs. 21. 1913.

⁴⁹ SAPËHIN, A. A., Über das Verhalten der Plastiden in sporogenen Gewebe. Ber. Deutsch. Bot. Gesells. 29:491-496. figs. 5. 1911.

⁵⁰ ———, Untersuchung über die Individualität der Plastide. Ber. Deutsch. Bot. Gesells. 31:14-16. 1913.

monoplastic; each sperm receives one plastid. SAPĚHIN claims that the bodies described by ALLEN, in the spermatogenesis of *Polytrichum*, as blepharoplasts, are nothing but plastids. Since SAPĚHIN's account is not illustrated, one must feel rather skeptical in regard to his interpretation of ALLEN's work.

—CHARLES J. CHAMBERLAIN.

Botrychium Lunaria.—LANG⁵¹ has published the first of a series of papers on the vascular anatomy of the Ophioglossaceae. From examination of *Botrychium Lunaria* he concludes that the internal endodermis is a new formation without morphological significance. The occurrence of occasional tracheids in the pith, especially in injured plants, is accepted as conclusive evidence of the stelar nature of the pith. These scattered tracheids are primary in their origin and by reason of their position are identified as centripetal xylem; hence this species of *Botrychium* has mesarch stem structure.

Axillary buds are of constant occurrence in this species, as in *Helminthostachys*. These develop only in case of injury to the terminal bud. The vascular supply of the branch arises from the trace of the leaf immediately below by the development of adaxial xylem; occasionally the xylem of the branch may be connected directly with that of the main stem.—L. C. PETRY.

Lichens of the Galapagos Islands.—STEWART⁵² has reported on the lichens collected by the expedition of the California Academy of Sciences to the Galapagos Islands in 1905–1906. These islands have long been of great biological interest, so that any collection from them promises to be worth noting. The list numbers 47 species, 7 of which are undetermined. The genera represented are as follows: *Alectoria* (1 sp.), *Arthonia* (4 spp.), *Buellia* (2 spp.), *Chiodecton* (1 sp.), *Cladonia* (6 spp.), *Coenogonium* (1 sp.), *Lecanora* (3 spp.), *Lecidea* (1 sp.), *Pannaria* (1 sp.), *Parmelia* (4 spp.), *Pertusaria* (2 spp.), *Physcia* (2 spp.), *Placodium* (1 sp.), *Pyrenula* (1 sp.), *Ramalina* (5 spp.), *Rinodina* (1 sp.), *Roccella* (2 spp.), *Sticta* (2 spp.), *Teloschistes* (1 sp.), *Usnea* (4 spp.), *Verrucaria* (1 sp.).—J. M. C.

Plants of northwestern Canada.—STANDLEY⁵³ has determined the plants collected by an expedition to the Mount Robson region of eastern British Columbia and western Alberta in 1911, under the auspices of the Alpine Club, whose headquarters are at Banff, Alberta. The collection includes about 200 numbers, all of which are angiosperms except 5 mosses, 6 pteridophytes, and 3 gymnosperms. A new species was discovered in each of the following genera: *Carex*, *Vagnera*, *Artemisia*, *Aster*, *Gaillardia*.—J. M. C.

⁵¹ LANG, WILLIAM H., Studies in the morphology and anatomy of the Ophioglossaceae. I. On the branching of *Botrychium Lunaria*, with notes on the anatomy of young and old rhizomes. Ann. Botany 27:203–242. figs. 1–14. pls. 20–21. 1913.

⁵² STEWART, ALBAN, Notes on the lichens of the Galapagos Islands. Proc. Calif. Acad. Sci. IV. 1:431–446. 1912.

⁵³ STANDLEY, PAUL C., Plants of the Alpine Club expedition to the Mount Robson region. Canadian Alpine Journal, special number, pp. 76–97. 1912.